

APPENDIX 2

Method 2

Step 1 (see Method 1).

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Step 2 (see Method 1).

Step 3 (see Method 1).

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Step 4 (see Method 1).

Step 5 Decomposition of the Source and Decoded images into a *Laplace Pyramid* of N levels constructed in two steps:

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- Each level P_n is firstly obtained by $\frac{1}{2}$ Decimation-Filtering (low-pass) of the immediately preceding level (multiresolution pyramid, Figure 4).

$$P_n = F_{1/2}(P_{n-1}) \quad n > 0$$

$$P_0 = \text{original image}$$

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- Then from each level P_n is deducted the immediately succeeding level expanded by 2 so as to obtain L_n (Laplace pyramid, Figure 5).

$$L_n = P_n - E_2(P_{n+1}) \quad n < N$$

$$L_N = P_N$$

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This calculation makes it possible to obtain a representation of a multiresolution pyramid P_n in accordance with Figure 4 and a representation of a Laplace pyramid L_n in accordance with Figure 5.

If the Filter $F_{1/2}$ is well chosen, the image L_n is a good approximation of the energy included within a frequency band centred around

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$$f_n = 1/(n + 1).$$

Finally, two Laplace Pyramids are available: LS_n (Source) and LD_n (Decoded).

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Step 6 By the same principle, the multiresolution Pyramid R_n of the Regions image is constructed by replacing $F_{1/2}$ by $G_{1/2}$ $\frac{1}{2}$ Decimation/median Filter. Thus, for each pixel of each level of the Laplace Pyramids (Step 5), the local value of the motion is available.

Step 7 Calculation of the level-to-level inter-Pyramid Differences:

$$Diff_n = LS_n - LD_n$$

5 Step 8 Application of the *principle of frequency masking* (Texture/Masking):

The relative influence of the activity at the frequency f_n is masked by considerable activity in the higher frequencies ($f_k < n$).

The relative local influence of pixel pi , $I_n(pi)$ is then defined by:

$$I_n = \frac{E_n}{\sum_{k < n} m(E_k)} \text{ with: } E_n = (Diff_n(pi))^q$$

10 with $q = 2$ for example.

Step 9 *Filtering of the Source and Decoded Laplace Pyramids.*

Each pixel pi of L_n is weighted by the value $H(f_n, v)$, corresponding to the Region(v) to which pi belongs in R_n , and by the relative influence I_n .

15 $T_n(pi) = I_n(pi) \times H$

Step 10 Directional Filtering: to take account of the psychovisual directions favoured by the human gaze, it is possible to filter the images T_n by directional filters which favour one direction with respect to others.

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Step 11 *Construction of the Map of Disparities or psychovisual Errors:* the multiresolution pyramids P'_n are recomposed:

$$P'_n = E_2(P'_{n+1}) + T_n \quad (n < N)$$

$$P'_N = T_N$$

25 The Map of disparities corresponds to P'_0 .

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